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**SE(4A) | 19F-0916**

Operating System Lab

Assignment 12 Monitors

**TASK # 01**

**A computer screen capture

Description automatically generated with low confidence**

**Cpp code:**

**#include <iostream>**

**#include <pthread.h>**

**#include<unistd.h>**

**using namespace std;**

**void \* person1(void \*);**

**void \* person2(void \*);**

**void \* person3(void \*);**

**void \* agent1(void \*);**

**class Monitor**

**{**

**public:**

**Monitor()**

**{**

**pthread\_mutex\_t Mutex1 = PTHREAD\_MUTEX\_INITIALIZER;**

**pthread\_cond\_t Cond1 = PTHREAD\_COND\_INITIALIZER;**

**pthread\_cond\_t MoreItems = PTHREAD\_COND\_INITIALIZER;**

**milk = 0;**

**water = 0;**

**coffee = 0;**

**count = 0;**

**count1 = 0;**

**count2 = 0;**

**count3 = 0;**

**}**

**void MakeCoffee()**

**{**

**count++;**

**if (count == 1)**

**{**

**count1 = 1;**

**pthread\_mutex\_lock(&Mutex1);**

**coffee = 9999;**

**cout << endl << "Person 1 Has Unlimited Coffee but needs Water and Milk" << endl;**

**if (water == 0 || milk == 0)**

**{**

**pthread\_cond\_signal(&MoreItems);**

**pthread\_mutex\_unlock(&Mutex1);**

**pthread\_mutex\_lock(&Mutex1);**

**pthread\_cond\_wait(&Cond1,&Mutex1);**

**pthread\_mutex\_unlock(&Mutex1);**

**}**

**else**

**pthread\_mutex\_unlock(&Mutex1);**

**}**

**if (count == 2)**

**{**

**count2 = 1;**

**pthread\_mutex\_lock(&Mutex1);**

**water = 9999;**

**cout << endl << "Person 2 Has Unlimited water but needs Coffee and Milk" << endl;**

**if (coffee == 0 || milk == 0)**

**{**

**pthread\_cond\_signal(&MoreItems);**

**pthread\_mutex\_unlock(&Mutex1);**

**pthread\_mutex\_lock(&Mutex1);**

**pthread\_cond\_wait(&Cond1,&Mutex1);**

**pthread\_mutex\_unlock(&Mutex1);**

**}**

**else**

**pthread\_mutex\_unlock(&Mutex1);**

**}**

**if (count == 3)**

**{**

**count3 = 1;**

**pthread\_mutex\_lock(&Mutex1);**

**milk = 9999;**

**cout << endl << "Person 3 Has Unlimited milk but needs Water and Coffee" << endl;**

**if (coffee == 0 || water == 0)**

**{**

**pthread\_cond\_signal(&MoreItems);**

**pthread\_mutex\_unlock(&Mutex1);**

**pthread\_mutex\_lock(&Mutex1);**

**pthread\_cond\_wait(&Cond1,&Mutex1);**

**pthread\_mutex\_unlock(&Mutex1);**

**}**

**else**

**pthread\_mutex\_unlock(&Mutex1);**

**}**

**}**

**void ProvideCoffee()**

**{**

**if (count1 == 1)**

**{**

**pthread\_cond\_wait(&MoreItems,&Mutex1);**

**int temp1, temp2;**

**cout << endl << "Agent add milk for 1st Person : ";**

**cin >> temp1;**

**milk = milk + temp1;**

**cout << "Agent add water for 1st Person : ";**

**cin >> temp2;**

**water = water + temp2;**

**if (temp1 <= temp2)**

**{**

**cout<<"Person 1 Got "<< temp1 <<" Coffees !!" << endl;**

**milk=milk-temp1;**

**water=water-temp1;**

**}**

**else**

**{**

**cout<<"Person 1 Got "<< temp2 <<" Coffees !!" << endl;**

**milk=milk-temp2;**

**water=water-temp2;**

**}**

**pthread\_cond\_signal(&Cond1);**

**}**

**if (count2 = 1)**

**{**

**pthread\_cond\_wait(&MoreItems,&Mutex1);**

**int temp1, temp2;**

**cout << endl << "Agent add milk for 2nd Person : ";**

**cin >> temp1;**

**milk = milk + temp1;**

**cout << "Agent add coffee for 2nd Person : ";**

**cin >> temp2;**

**coffee = coffee + temp2;**

**if (temp1 <= temp2)**

**{**

**cout<<"Person 2 Got "<< temp1 <<" Coffees !!" << endl;**

**milk=milk-temp1;**

**coffee=coffee-temp1;**

**}**

**else**

**{**

**cout<<"Person 2 Got "<< temp2 <<" Coffees !!" << endl;**

**milk=milk-temp2;**

**coffee=coffee-temp2;**

**}**

**pthread\_cond\_signal(&Cond1);**

**}**

**if (count3 = 1)**

**{**

**pthread\_cond\_wait(&MoreItems,&Mutex1);**

**int temp1, temp2;**

**cout << endl << "Agent add coffee for 3rd Person : ";**

**cin >> temp1;**

**coffee = coffee + temp1;**

**cout << "Agent add water for 3rd Person : ";**

**cin >> temp2;**

**water = water + temp2;**

**if (temp1 <= temp2)**

**{**

**cout<<"Person 3 Got "<< temp1 <<" Coffees !!" << endl;**

**water=water-temp1;**

**coffee=coffee-temp1;**

**}**

**else**

**{**

**cout<<"Person 3 Got "<< temp2 <<" Coffees !!" << endl;**

**water=water-temp2;**

**coffee=coffee-temp2;**

**}**

**}**

**pthread\_cond\_signal(&Cond1);**

**}**

**private:**

**pthread\_mutex\_t Mutex1;**

**pthread\_cond\_t Cond1;**

**pthread\_cond\_t MoreItems;**

**int milk;**

**int water;**

**int coffee;**

**int count;**

**int count1;**

**int count2;**

**int count3;**

**}Cafe;**

**int main()**

**{**

**pthread\_t FirstPerson, SecondPerson, ThirdPerson, Agent;**

**pthread\_create(&FirstPerson,NULL,person1,NULL);**

**pthread\_create(&SecondPerson,NULL,person2,NULL);**

**pthread\_create(&ThirdPerson,NULL,person3,NULL);**

**pthread\_create(&Agent,NULL,agent1,NULL);**

**pthread\_exit(NULL);**

**return 0;**

**}**

**void \* person1(void \*)**

**{**

**while (1)**

**Cafe.MakeCoffee();**

**sleep(1);**

**}**

**void \* person2(void \*)**

**{**

**while (1)**

**Cafe.MakeCoffee();**

**sleep(1);**

**}**

**void \* person3(void \*)**

**{**

**while (1)**

**Cafe.MakeCoffee();**

**sleep(1);**

**}**

**void \* agent1(void \*)**

**{**

**while (1)**

**Cafe.ProvideCoffee();**

**sleep(1);**

**}**